24 May 2005

U.S. House of Representatives
Subcommittee on Forests and Forest Health
Committee on Resources

STATEMENT OF C.T. (Tat) SMITH, representing Texas A&M University

Production of Bioenergy and Biobased Products from Sustainable Forestry

I would like to thank the Subcommittee for the opportunity to testify on the topic of production of bioenergy and biobased products from sustainable forest management.

This topic is timely and urgent as utilization of forest biomass can contribute directly to increasing forest health and reducing risk of wildfire, insect epidemics and disease; reducing our dependence on foreign sources of petroleum and thereby increasing energy security; reducing net carbon emissions and making positive contributions to reducing emissions that contribute to climate change; and contributing to rural economic development and social well being. I applaud the Subcommittee for providing leadership in addressing these issues.

Background issues and opportunities

A systems approach has been taken by collaborators in the International Energy Agency (IEA) Task 31 "Biomass Production for Energy from Sustainable Forestry", of which the United States is a participating country through the Department of Energy (DOE) and USDA Forest Service, to analyzing the value chain associated with biomass feedstock for energy and biobased products. This systems analysis has been conducted to identify technical and non-technical barriers along the value chain to dissemination and deployment of bioenergy and biobased products production systems based on sustainable use of naturally regenerated and plantation forests throughout the world.

Forest industry currently utilizes most manufacturing residues for bioenergy and biobased products. Opportunities for increased utilization of forest biomass will come from sources that are currently under utilized, such as thinnings from dense, small diameter, overstocked stands, harvesting residues, wildland urban interface (WUI) areas posing high fire risk, and urban forests and wood residues. Greater utilization of forest biomass can result in enhanced environmental, economic and social benefits to forests and rural economies and forest dependent communities. Enhanced environmental benefits associated with managed forests include increased forest health and wildlife habitat quality. Greater production of bioenergy can help achieve national goals for increasing energy security and reducing the potential for climate change. Regional differences in forest ownership patterns between public and private lands requires development of regional strategies for increasing forest health and stimulating globally competitive private enterprise at the local level.

In 2004, Gan and Smith estimated the availability of logging residues in the U.S. based on the 1997 Forest Inventory Analysis (FIA) data. The amount of electricity generated from the logging residues and the electricity generation cost were estimated based on a gasification combined-cycle power generation system. According to the C emission rate from coal-fueled power generation and the cost difference between fossil- and biomass-fueled electricity production, the magnitude and cost of C displacement were derived. There are about 22 million dry tons of logging residues from forest growing stock (growing stock cut or knocked down during harvest but left on the ground) and additional 34 million dry tons from other sources (wood other than growing stock cut or knocked down during harvest but left at harvest sites) each year in the U.S. These estimates are in agreement with the recently published "Billion-Ton Vision Report" (Perlack et al. 2005) (www.eere.energy.gov/biomass/pdfs/final_billionton_vision_report2.pdf) that estimated logging residues amounted to 11% of the total amount of biomass available annually from forests in the U.S.

Most logging residues are located in the eastern U.S., with over 50% in the Southeast and South Central regions. The residues from growing stock could generate $2.6x10^{13}$ kWh electricity annually; but the electricity generated would amount to $6.7x10^{13}$ kWh if the residues from both growing stock and other sources are used. This would displace 7.5 million to 19 million tons C emitted from coal-fueled power plants, accounting for 1.2% to 3% of the total C emissions from the U.S. electricity sector in 1997. The cost of offsetting C emissions using logging residues in electricity generation would range from $36 to 45/ton C, considerably lower than that of other C sequestration options currently available.

Technical and non-technical barriers to deployment of forest biomass based systems

Analysis of the biomass value chain in the U.S. indicates that biomass from conventionally managed forests might be able to compete on the open market with coal for electricity production if there are significant reductions in the price of delivered biomass feedstocks due to increased forest biomass production rates, reductions in harvesting, processing and transportation rates, and reductions in the capital costs of electricity generating facilities. Current research and development programs focused on forests and forest bioenergy and biobased products that are managed by DOE and USDA are not adequately resourced to move the U.S. ahead with any reasonable speed. Research and development projects need to be focused on critical points in the value chain from sustainable feedstock supply to consumer markets for bioenergy and biobased products.

Recent analysis by Wheelabrator Technologies, Inc. indicates substantial opportunity exists for merchantable utilization of forest biomass for energy in the western U.S. public forests if stewardship contracts are implemented that are of adequate length (e.g. 20 years) and reliability, and if Renewable Energy Premium ($0.01/kWh) and Federal Biomass Tax Credit ($0.01-0.018/kWh) are available. Strategies for increasing the health of western forests typically have little utility in other heavily forested regions of the country. However, realization of this opportunity will help restore the infrastructure lost

throughout the intermountain West following drastic reductions in National Forest logging.

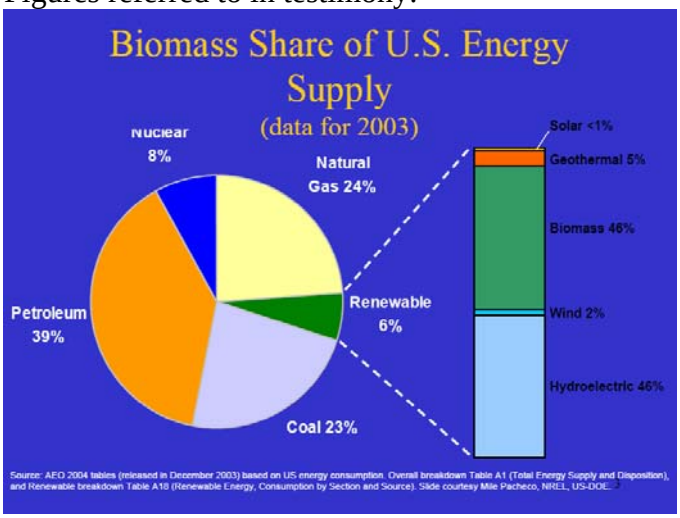
We believe international research knowledge related to the development of forest bioenergy production systems based on conventional forest resources has great utility for the southern U.S. forestry sector. We must take advantage of what we already know to rapidly develop knowledge products to inform and train rural community leaders and practitioners involved in growing, harvesting, transporting, and processing biomass and biobased products. It is anticipated that dissemination of technical information and research and development focused on the technical and non-technical barriers limiting deployment of forest bioenergy and biobased products production systems will contribute to increased competitive advantage of forest biomass over non-renewable fossil fuel and feedstocks.

What can Congress do to help?

A list of potential action items includes the following:

- Demand greater production of renewable energy.
- Stimulate integrated bioenergy and biobased products industries across agriculture and forestry sectors.
- Rationalize among Healthy Forest Restoration Act (HFRA), Farm Bill, and Energy Bill.
- Resource unfunded HFRA titles (e.g. Biomass Title).
- Urge more efficient coordination of relevant federal and state programs and advisory committees.
    - e.g. between DOE and USDA; within USDA; specifically among Biomass Research and Development Technology Advisory Committee, USDA Biobased Products and Bioenergy Coordination Council (BBCC), and Forestry Research Advisory Council (FRAC)
- Demand real-time progress in research, development that will lead to deployment of globally competitive, forest-based bioenergy and biobased product production systems.
    - Focus R&D at all critical points along the value chain from sustainable feedstock supply to consumer markets for bioenergy and biobased products.
    - Ensure forest-based R,D&D does not continue to fall between the cracks in national programs.
- Note the regional differences in the importance of public and private lands to rural economies and communities and achieving national goals for restoring healthy forests.
    - West vs South vs North Central and Northeast
- Increase the effectiveness of long-term stewardship contracts on public lands.
- Ensure family farms benefit from enhanced bioenergy and biobased products programs, and that non-public lands increase levels of biomass utilization.
- Increase opportunities for university programs to contribute to national programs in this area.

Figures referred to in testimony:



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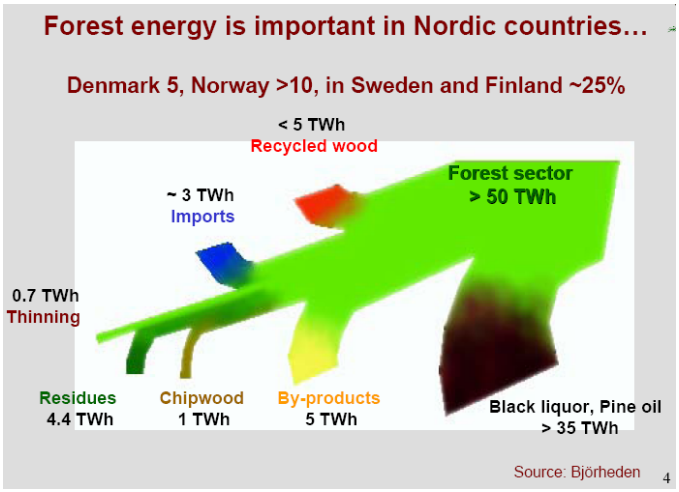

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Annual Recoverable Logging Residues

Region	Amount (1,000 dry tons)	%
Northeast	8,306	20.9
North Central	7,680	19.3
Southeast	6,845	17.2
South Central	12,352	31.0
Great Plains	109	0.3
Intermountain	1,376	3.5
Alaska	675	1.7
PNW (OR & WA)	1,543	3.9
PSW (CA)	972	2.3
US total	39,858	100.0

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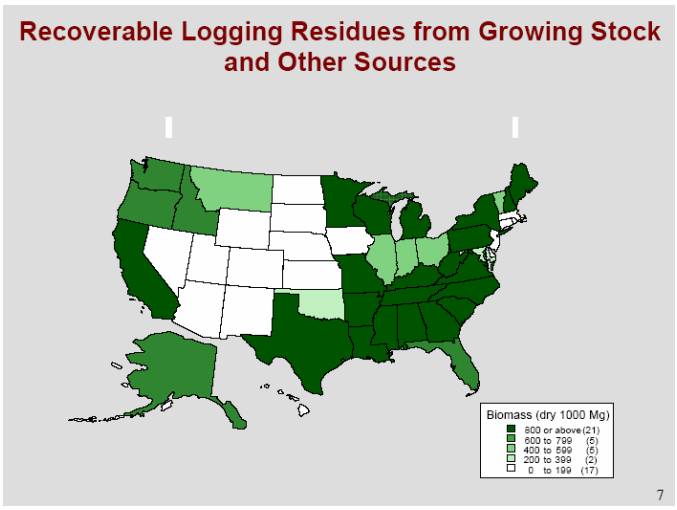

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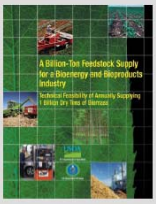

DOE/USDA
Billion Ton Vision Report
www.eere.energy.gov/biomass/pdfs/final_billionton_vision_report2.pdf

Annual biomass resource potential (10^6 dry tons/yr)

41	Logging & other residue
60	Fuel treatments
35	Fuel wood
106	Forest products industry waste
37	Urban wood residues
89	Forest growth
368	Forest resources
998	Agricultural resources
1366	Total resource potential

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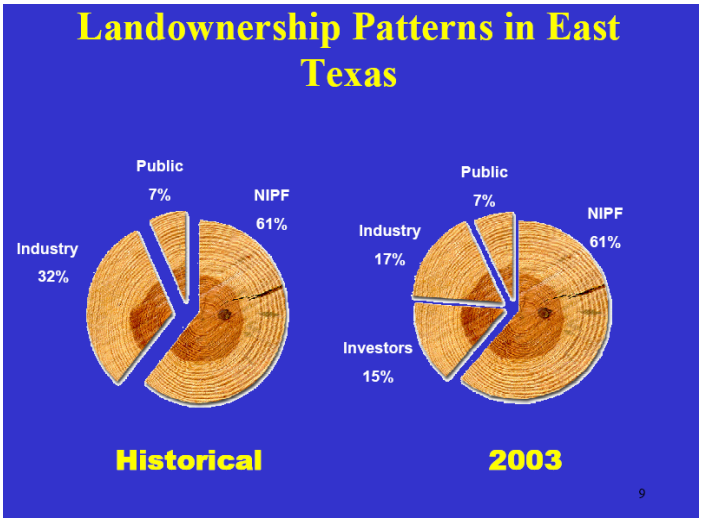

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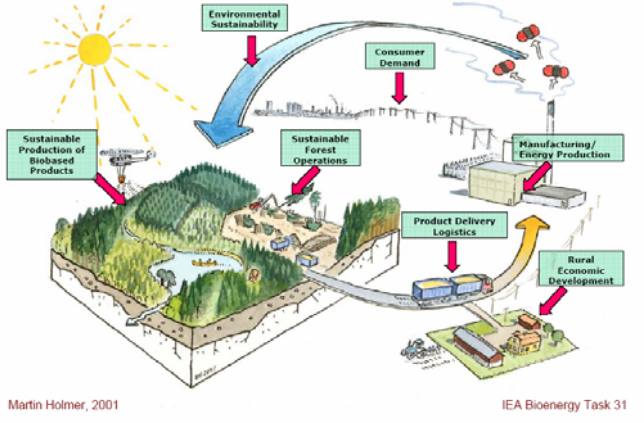
Critical Components of Sustainable Bioenergy Production Systems



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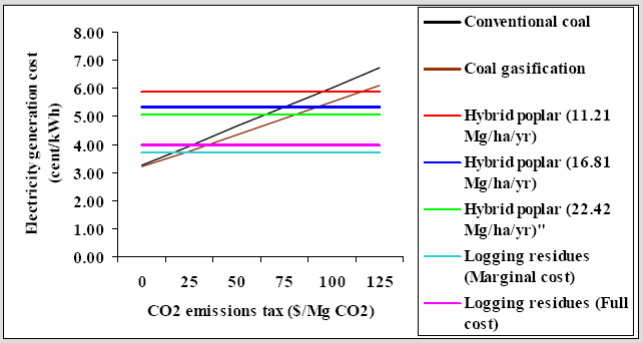
Cost competitiveness of using woody biomass in U.S. electricity production



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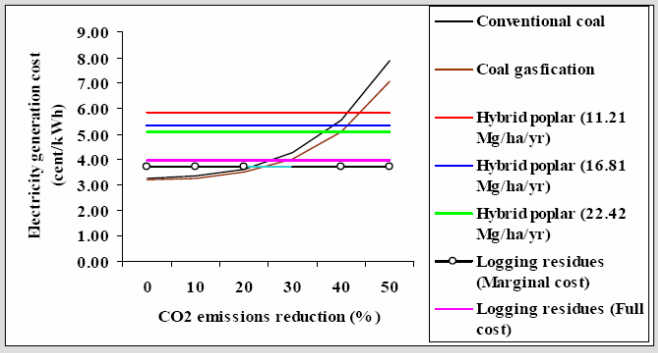
U.S. electricity generation cost under various CO_2 emission reductions



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What might enable deployment of bioenergy production systems using forest fuels in the USA?

- Sustainable high rates of biomass productivity
- Competitive biomass procurement and transportation systems
- Competitive cost of capitalization

Local factors differ…

e.g. forest growth rates, production costs, skilled labor, affordable capital, efficient equipment

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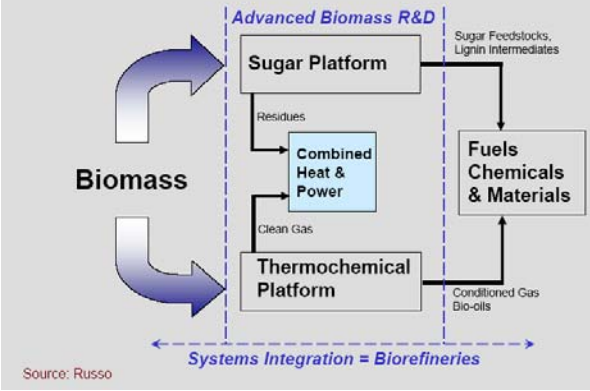
U.S. Department of Energy
Energy Efficiency and Renewable Energy
Office of the Biomass Program



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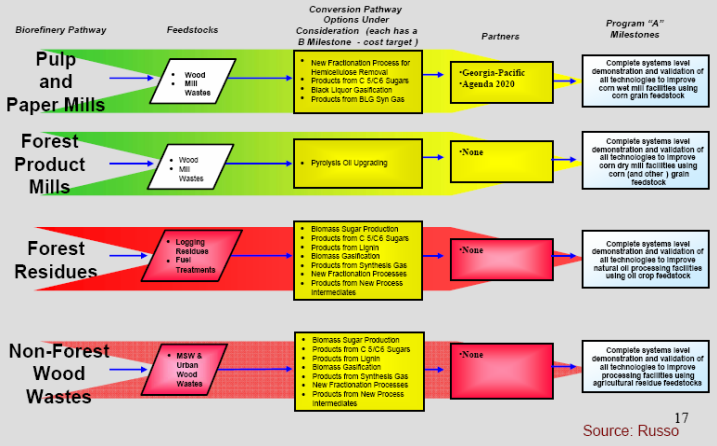
Forest Sector Biorefinery Pathways

Note DOE "partner" opportunities!



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